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DEVICE AND METHOD FOR MONITORING THE STATE OF THE SUBSTRUCTURE OF FIXED TRACKS

The invention relates to a device and a method for monitoring the state of the substructure of fixed tracks, especially in the transition region of substructure supporting plates.

Constant monitoring of the support conditions of fixed tracks is required for evaluating the stresses on the fixed track system and for determining possible deviations of specified geometries in the area of massive substructures, for example, of bridges or supports. In particular, the transitions between the support plate elements, functioning as substructure of the fixed track, are regarded as critical sites in this connection. Track transitions at constructional work, such as bridges and tunnels, are further points at which monitoring procedures should be concentrated.

It is therefore an object of the invention to provide a device and a method for achieving simple monitoring of the state of the substructure especially in these critical transition regions so that, for example, a breaking away of the edges of the substructure plates can be recognized in good time and, if necessary, repairs be made.

Pursuant to the invention, this objective is accomplished owing to the fact that measuring bolts, which protrude beyond the track plate and, in vertical recesses, pass freely through the track plate above, are fastened at the ends of the substructure plates, which are to be monitored.

The measuring bolts may be introduced into the substructure plate before the track plate is mounted or also be installed in the substructure plate through subsequently provided boreholes after the fixed track is finished.

Monitoring rides with measuring vehicles, which are equipped with a laser scanning device for determining the height offset of the measuring bolts, are employed to monitor the substructure state of a fixed track with such a device.

If it is ensured from the very start that all measuring bolts protrude precisely by a specified amount beyond the track plate, each deviation in the height of the measuring bolt from this nominal height can be used as an absolute criterion for a change in the state of the substructure plate. However, since such a possibility can hardly be adhered to in practice, the height offset of each measuring bolt from a preceding measurement is used for monitoring rides and the change in height Δh of the substructure plate in comparison to the fixed track plate is determined separately for each measuring bolt.

Further advantages, distinguishing features and details of the invention arise out of the following description of an example, as well as from the drawing, in which

Figure 1 shows a diagrammatic section through a fixed track with discrete substructure plates, similar to those which occur particularly in the transition region at constructional work, such as bridges and tunnels, and

Figure 2 shows an enlarged section II in the region of a measurement bolt.

Figure 1 shows a substructure supporting plate 1, on which a fixed track plate 2 is mounted, which, in turn, carries the continuous rails 3.

In order to be able to monitor the critical transition region between two track supporting plates 1, especially in the region of the track transitions at constructional work, such as bridges and tunnels, or at other transitions, as easily as possible, measuring bolts 6 fastened at the ends 4, 5 of the supporting plates 1. In turn, the measuring bolts 6 pass freely through the track plate 2 above in vertical recesses 7 and protrude beyond the fixed track plate preferably by a small amount. The height of the tip of each measuring bolt 7 can be determined very easily during monitoring rides with the help of a laser measuring system. Preferably, any height change in the substructure plate 1 can be ascertained very easily preferably by determining the change in height Δh from a previous measurement.

The measuring bolt 6 can be installed in the substructure plate 1 before the track plate 2 is mounted as well as after the fixed track is finished, in which case a borehole 7 is subsequently produced in the substrate plate 1.